Multipoint Insertion Flow Meter
Series K-BAR 2000B-WGF

The Kurz K-BAR WGF multipoint insertion flow meter for condensing gas environments includes the qualities and features found in all Kurz constant temperature thermal flow meters that make them outperform all other currently available thermal mass flow meters, including:

- The first thermal mass flow meter offering accurate and reliable condensing gas flow measurements
- The highest repeatability, accuracy, and reliability available
- The fastest response to temperature and velocity changes in the industry
- Constant temperature thermal technology
- Interchangeable sensor and electronics (single circuit board for each sensor) — no matched sets
- Built-in dry gas flow calculation on all flow units for saturated processes
- Continuous self-monitoring electronics that verify the integrity of sensor wiring and measurements
- Sensors do not overheat at zero flow using a unique constant temperature control method and power limiting design
- Zero velocity as a valid data point
- Completely field configurable using the flow meter user interface or via a computer connection
- User-programmable correction factors to compensate for velocity profiles
- Velocity-temperature mapping for wide ranging velocity and temperature

Kurz Instruments is dedicated to manufacturing and marketing the best thermal mass flow meters available and to support our customers in their efforts to improve their businesses.

Applications
- Condensing stacks
- Stack & flue gas
- Biogas
- Emissions monitoring
- Mine ventilation
- Fan inlets
SPECIFICATIONS

- **Velocity range**
  0 to 6,000 SFPM (28 NMPS)
  (Up to 12,000 SFPM (56 NMPS) available with reduced condensate immunity)

- **Dry velocity accuracy**
  ± (1% of reading +20 SFPM)

- **0.25% reading repeatability**

- **Velocity time constant**
  1 second for velocity changes at 6,000 SFPM (constant temperature)

- **Process temperature time constant**
  8 seconds for temp changes at 6,000 SFPM (constant velocity)

- **Velocity angle sensitivity**
  <2% per degree angle up to ±20°

- **Velocity-dependent correction factors for flow rate**

- **Electronics operating temperature**
  -40°F to 149°F (‐40°C to 65°C)

PROCESS CONDITIONS

- **Process pressure rating**
  Up to 150 PSIG (10 BARg)

- **Process temperature rating**
  -40°F to 257°F (‐40°C to 125°C)

- **Process conditions**
  Up to 100% relative humidity

- **Condensing gas**

APPROVALS

- **EPA mandatory GHG certification**
  40 CFR 98.34(c)(1)

- **Alarm output conformity**
  NAMUR NE43

- **European Union CE compliance**
  EMC, LVD, PED, ROHS, and WEEE

- **EU ATEX, Increased Safety**
  EN 60079-0:2018 and EN60079-7:2015/A1:2018
  II 3 G, Ex ec IIC T5...T3 Gc
  Flow Element Tp: -40 to 55 °C/T5 or to 130 °C/T3
  Flow Transmitter Ta: -40 to 50 °C/T6 or to 65 °C/T5

TRANSMITTER FEATURES

- **Steel, 16 gauge (Type 4, IP65) polyester powder-coated enclosure**

- **Two optically-isolated loop powered 4-20 mA outputs**
  12-bit resolution and accuracy
  Maximum loop resistance is 300Ω at 18 VDC,
  550Ω at 24 VDC, 1400Ω at 36 VDC

- **One 4-20mA non-isolated analog input**

- **Input power**
  1 Amp per sensor, DC (21.6-26.4V)

- **Two optically isolated solid-state relays / alarms**
  Configurable as alarm outputs, pulsed totalizer output, or air purge cleaning

- **Two digital inputs dedicated to purge and zero-mid-span drift check**

- **Velocity-dependent correction factors for flow rate**

- **Built-in zero-mid-span drift check**

- **Built-in flow totalizers and elapsed time**

- **User-configurable digital filtering from 0 to 600 seconds**

- **Configuration/data access**
  USB, RS-485 Modbus (ASCII or RTU), or HART

- **Meter memory**
  200 recent events, top 20 min/max, and
  56 hours (10 second samples) of trends

SUPPORT & ELEMENT COMPONENTS

- **Sensor material**
  C-276 alloy all-welded sensor construction (standard)

- **Sensor support**
  316L stainless steel (standard)
  Hastelloy® C-22® alloy (optional)

- **Sensor support diameter**
  Segment 1 — 1½” tubing (standard)
  Segment 2 — 2½” (Sch.10)
  Segment 3 — 4” (Sch 10)

- **Sensor support length**
  Maximum length based on supported or self-supporting design and the number of sensors

- **Mounting flange**
  Raised face Class 150 ANSI B16.5

- **3-year warranty**

OPTIONS

- **Communication protocols**
  HART (v7 FSK) and PROFIBUS DP

- **Hardware accessories**
  Available hardware includes flange mounting assemblies, ball valves, conduit seals, cable, and packing glands

- **SIL1 certification**
  via TUV Rheinland

Series K-BAR 2000B-WGF
K-BAR DESIGN

All K-BARs include the flange-to-inside-wall (FTIW) measurement when determining the length of the probe support.

The K-BAR can be a supported or self-supporting structure.

- A supported K-BAR has an external or internal support cup on the wall opposite the mounting flange. A supported K-BAR allows for a smaller flange and a consistent 1.5” probe support across the width of the stack/duct. A supported probe support with 1, 2, 3, or 4 sensors can be up to 173” (including the FTIW distance).

- A self-supporting K-BAR, depending on the length, can have up to three support probe sections that reduce in diameter toward the probe support tip. In addition, the number of sensors is a factor in determining the maximum probe support length.
  - One segment = 1.5”, stack/duct up to 302 inches
  - Two segments = 2.875”, 1.5”, stack/duct up to 488 inches
  - Three segments = 4.5”, 2.875”, 1.5”, stack/duct up to 460 inches

Note: The additional material used to increase the diameter of segments 2 and 3 also slows the effects of corrosion on the probe support.

HALF SPAN AND FULL SPAN

Using a supported or self-supporting K-BAR is determined by several factors:

- The dimensions of the stack or duct
- The accessibility of an installation location
- The flow profile of the stack or duct
- Excessive vibration
The KBAR-2000B is designed to work seamlessly with the Series 155 Mass Flow Computer. The Series 155 Mass Flow Computer integrates the functions of temperature and flow measurement, closed loop flow control, flow totalization, sensor dropout correction, alarms, input/output calibration, and data acquisition from up to 22 sensors.
Series K-BAR 2000B-WGF

**Multipoint Insertion Thermal Mass Flow Meter**

**Identifier**

- **D**: The round stack/duct diameter or rectangular stack/duct flow inside dimension (inches).
- **FTIW**: The flange-to-inside wall measurement for determining the overall length of the probe support includes gaskets, flanges, and stack/duct wall thickness.

**Dimensions**

All dimensions are in inches with millimeters in brackets.

<table>
<thead>
<tr>
<th>Identifier</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>D</strong></td>
<td>The round stack/duct diameter or rectangular stack/duct flow inside dimension (inches).</td>
</tr>
<tr>
<td><strong>FTIW</strong></td>
<td>The flange-to-inside wall measurement for determining the overall length of the probe support includes gaskets, flanges, and stack/duct wall thickness.</td>
</tr>
</tbody>
</table>

**Model 190-4B**

- **FTIW**: 1.5
- **L1**: 38.10
- **L2**: 4.5
- **L3**: 73.03
- **U1**: 2.875

**Model 196-4B**

- **FTIW**: 1.5
- **L1**: 38.10
- **L2**: 12.3
- **L3**: 1.5
- **U1**: 4.5

**Model 196-4B**

- **FTIW**: 1.5
- **L1**: 311.15
- **L2**: 12.3
- **L3**: 1.5
- **U1**: 6.0

**Model 195-4B**

- **FTIW**: 1.5
- **L1**: 38.10
- **L2**: 12.3
- **L3**: 1.5
- **U1**: 4.5

**Model 195-4B**

- **FTIW**: 1.5
- **L1**: 311.15
- **L2**: 12.3
- **L3**: 1.5
- **U1**: 6.0

**Model 195-4B**

- **FTIW**: 1.5
- **L1**: 38.10
- **L2**: 12.3
- **L3**: 1.5
- **U1**: 4.5

**Model 195-4B**

- **FTIW**: 1.5
- **L1**: 311.15
- **L2**: 12.3
- **L3**: 1.5
- **U1**: 6.0

**Model 195-4B**

- **FTIW**: 1.5
- **L1**: 38.10
- **L2**: 12.3
- **L3**: 1.5
- **U1**: 4.5
### Option 5: Communications and Inputs/Outputs

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>Full</td>
</tr>
<tr>
<td>E</td>
<td>HART-1</td>
</tr>
<tr>
<td>H</td>
<td>HART-2</td>
</tr>
<tr>
<td>K</td>
<td>Profibus DP</td>
</tr>
</tbody>
</table>

- **C Full**: Two 4-20mA isolated outputs, two relays, two digital inputs, one non-isolated 4-20mA input
- **E HART-1**: One 4-20mA isolated output, two relays, two digital inputs, one non-isolated 4-20mA input
- **H HART-2**: Two 4-20mA isolated outputs, two relays, two digital inputs, one non-isolated 4-20mA input
- **K Profibus DP**: Two 4-20mA isolated outputs, two relays, two digital inputs, one non-isolated 4-20mA input

### Option 6: Flange-to-Inside Wall Length (FTIW)

- **Enter 3 digits.** For example, the distance between the stack mounting flange and inside wall of the stack/duct (including gasket and wall thickness) is 56.25 inches and written as 563.

### Option 7: Process Temperature Compensation

- **Standard temperature compensation (STC)** over process temperature range from -40°C to 125°C.
  - Accuracy: ± (1% Reading + 20 SPM) ± 25°C

### Option 8: Sensors & Sensor Material

Choose one option from each category.

<table>
<thead>
<tr>
<th>Option</th>
<th>Number of Sensors (first digit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Two</td>
</tr>
<tr>
<td>3</td>
<td>Three</td>
</tr>
<tr>
<td>4</td>
<td>Four</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Option</th>
<th>Sensor Material (second digit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>C-276 alloy</td>
</tr>
<tr>
<td>7</td>
<td>C-276 alloy with abrasion-resistant aluminum titanium nitride (AlTiN) coating</td>
</tr>
</tbody>
</table>

### Option 9: Mounting Flange Size (CL150) & Thickness

<table>
<thead>
<tr>
<th>Option</th>
<th>Mounting Flange Size (CL150)</th>
<th>Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>1.5” (Type 1)</td>
<td>0.69”</td>
</tr>
<tr>
<td>J</td>
<td>2” (Type 1)</td>
<td>0.75”</td>
</tr>
<tr>
<td>L</td>
<td>2.5” (Type 1, 2)</td>
<td>0.88”</td>
</tr>
<tr>
<td>N</td>
<td>3” (Type 1, 2)</td>
<td>0.94”</td>
</tr>
<tr>
<td>Q</td>
<td>3.5” (Type 1, 2)</td>
<td>0.94”</td>
</tr>
<tr>
<td>S</td>
<td>4” (Type 1, 2)</td>
<td>0.94”</td>
</tr>
<tr>
<td>U</td>
<td>6” (Type 1, 2, 3)</td>
<td>1.0”</td>
</tr>
</tbody>
</table>
## Series K-BAR 2000B-WGF

### Multipoint Insertion Thermal Mass Flow Meter

2411 Garden Road • Monterey, CA 93940 | 800-424-7356 • 831-646-5911 | www.KurzInstruments.com

### Table of Options

#### F10: Mounting Flange Material

<table>
<thead>
<tr>
<th>Option</th>
<th>Mounting Flange Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>316L stainless steel</td>
</tr>
<tr>
<td>3</td>
<td>C-276 alloy</td>
</tr>
</tbody>
</table>

#### F11: Laboratory Air Velocity Calibration

<table>
<thead>
<tr>
<th>Option</th>
<th>Laboratory Air Velocity Calibration</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>300 SFPM (1.4 NMPS)</td>
</tr>
<tr>
<td>C</td>
<td>600 SFPM (2.8 NMPS)</td>
</tr>
<tr>
<td>E</td>
<td>1,000 SFPM (4.7 NMPS)</td>
</tr>
<tr>
<td>G</td>
<td>2,000 SFPM (9.3 NMPS)</td>
</tr>
<tr>
<td>I</td>
<td>3,000 SFPM (14 NMPS)</td>
</tr>
<tr>
<td>K</td>
<td>4,000 SFPM (18.6 NMPS)</td>
</tr>
<tr>
<td>M</td>
<td>6,000 SFPM (28 NMPS)</td>
</tr>
</tbody>
</table>

#### F12: Segment Material

Choose one option from each category.

<table>
<thead>
<tr>
<th>Option</th>
<th>Segment #1 Material (first digit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>316L SS tube / 316L SS windows     (Type 1, 2, 3)</td>
</tr>
<tr>
<td>3</td>
<td>C-22 alloy tube / C-276 alloy windows (Type 1)</td>
</tr>
<tr>
<td>6</td>
<td>C-22 alloy tube / 316L SS windows  (Type 1)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Option</th>
<th>Segment #2 Material (second digit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No segment 2 (Type 1)</td>
</tr>
<tr>
<td>2</td>
<td>316L SS pipe / 316L SS windows     (Type 2, 3)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Option</th>
<th>Segment #3 Material (third digit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No segment 3 (Type 1, 2)</td>
</tr>
<tr>
<td>2</td>
<td>316L SS pipe                      (Type 3)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Option</th>
<th>FTIW Segment Material (fourth digit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>316L SS pipe                        (Type 1, 2, 3)</td>
</tr>
<tr>
<td>3</td>
<td>C-22 alloy pipe / C-276 alloy pipe  (Type 1, Type 2, 3)</td>
</tr>
</tbody>
</table>

**Notes:**
Available configurations are 2002, 3003, 6003, 2202, 2203, 2222, and 2223.

Add the letter "S" to the end of Feature 12 to include SIL1 certification via TUV Rheinland.